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09/398,006	09/16/1999	YOICHI OKAMOTO	Q55806	9551

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EXAMINER
FISCHER, JUSTIN R

ART UNIT	PAPER NUMBER
1733	23

DATE MAILED: 08/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

22K-23

Office Action Summary	Application No. 09/398,006	Applicant(s) OKAMOTO ET AL.	
	Examiner Justin R Fischer	Art Unit 1733	

-- The MAILING DATE of this communication appears on th cover sh t with th corr spondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 August 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Claim 2 is cancelled per Amendment E on August 1, 2003.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bourdon (US 2,493,614, of record) and further in view of Kohno (US 5,968,295) and either one of Kabe (US 4,711,286, of record) or Suzuki (US 4,086,948, of record). Bourdon, Kohno, Kabe, and Suzuki are applied in the same manner as set forth in Paper Number 20, Paragraphs 2 and 5.

Bourdon, as best depicted in Figures 1 and 2, substantially teaches the pneumatic tire construction of the claimed invention, including a belt assembly formed of a radially innermost steel belt layer 2A, a middle steel belt layer 2B, and an outermost, high angled steel belt layer 2C, wherein said high angled steel belt layer extends axially outward of an outermost tread groove and is narrower than the radially innermost steel cord layer. With respect to the type of carcass, while the reference is completely silent with respect to the construction of the carcass, it is extremely well known and conventional in the manufacture of current tires to use radial carcass plies, as compared to bias carcass plies. For example, Kabe (Column 1, Lines 13-16) and Suzuki (Column

1, Lines 9-12) provide two examples of the well-known use of radial carcass plies in a variety of current, pneumatic tires for the benefits of improved reinforcement/wear characteristics. As such, one of ordinary skill in the art at the time of the invention would have found it obvious to form the pneumatic tire of Bourdon as a "radial" tire since this construction is extensively used in the manufacture of current, pneumatic tires, as compared to the bias carcass construction that was previously used. Lastly, regarding the compression modulus of the coating rubber, one of ordinary skill in the art at the time of the invention would have readily appreciated the broad range of the claimed invention (greater than **200 kgf/cm^2**) as defining extensively used coating rubber compositions in similar belt plies. Kohno, for example, is directed to a similar tire construction having an outermost belt layer that can be formed of steel in which the coating rubber has a compression modulus greater than **200 kgf/mm^2** in order to prevent the cords of this belt layer from moving and causing local buckling of said cord (Column 4, Lines 47-55). Thus, Kohno suggests a minimum value for the compression modulus that is 100 times greater than that required by the claimed invention, such that one of ordinary skill in the art at the time of the invention would have readily appreciated the claimed range of "at least 200 kgf/cm^2". It is further noted that applicant similarly attributes the benefits of reduced buckling fatigue to the inclusion of a coating rubber having a compression modulus of at least 200 kgf/cm^2 (Page 9, 2nd Paragraph). As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to form the coating rubber of the outermost layer of Bourdon with a compression modulus of at least 200 kgf/cm^2 as such a construction is extensively used

in the outermost belt plies formed of steel for the benefits detailed above, as shown for example by Kohno.

Regarding claim 5, applicant requires that the cord to cord distance between the end of the middle cord layer and the adjacent outermost cord layer is greater than 0.15 times the cord to cord distance between the same end of the middle cord layer and the adjacent inner layer. A fair reading of Bourdon as a whole suggests that the relevant distances would be approximately the same, as would be expected by one of ordinary skill in the art at the time of the invention. Thus, the cord-to-cord distance (defined by topping rubbers) between the middle cord layer the outermost cord layer would be approximately 1.0 times the cord to cord distance between the middle cord layer and the inner cord layer.

4. Claims 1 and 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farnsworth (GB 1,483,053, of record) and further in view of Kohno. Farnsworth and Kohno are applied in the same manner as set forth in Paper Number 20, Paragraphs 3 and 5.

Farnsworth, as best depicted in Figure 1, substantially teaches the pneumatic tire construction of the claimed invention, including a belt assembly formed of a radially innermost steel belt layer 4, a middle steel belt layer 3, and an outermost, high angled steel belt layer 2, is narrower than the radially innermost steel cord layer. In describing the axial extent of the belt assembly as a whole, Farnsworth suggests that said belt assembly has a maximum axial width between 90 and 110% of the axial width of the tread (Page 1, Lines 94-96). Although Farnsworth fails to depict the inclusion of tread

grooves, one of ordinary skill in the art at the time of the invention would have expected the tire of Farnsworth to contain a plurality of tread grooves as is conventional in pneumatic tires. Furthermore, one of ordinary skill in the art at the time of the invention would have found the claimed construction (outer ply is narrower than middle ply and extends outward of outermost tread groove) to be obvious in view of Figure 1 of Farnsworth and the aforementioned ranges regarding the axial extent of the belt assembly (e.g. whole belt assembly of Figure can have axial extension of up to 110% of tread width W). Lastly, regarding the compression modulus of the coating rubber, one of ordinary skill in the art at the time of the invention would have readily appreciated the broad range of the claimed invention (greater than **200 kgf/cm^2**) as defining extensively used coating rubber compositions in similar belt plies. Kohno, for example, is directed to a similar tire construction having an outermost belt layer that can be formed of steel in which the coating rubber has a compression modulus greater than **200 kgf/mm^2** in order to prevent the cords of this belt layer from moving and causing local buckling of said cord (Column 4, Lines 47-55). Thus, Kohno suggests a minimum value for the compression modulus that is **100 times greater** than that required by the claimed invention, such that one of ordinary skill in the art at the time of the invention would have readily appreciated the claimed range of "at least 200 kgf/cm^2". It is further noted that applicant similarly attributes the benefits of reducing buckling fatigue to the inclusion of a coating rubber having a compression modulus of at least 200 kgf/cm^2 (Page 9, 2nd Paragraph). As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to form the coating rubber of the outermost layer of

Farnsworth with a compression modulus of at least 200 kgf/cm^2 as such a construction is extensively used in the outermost belt plies formed of steel for the benefits detailed above, as shown for example by Kohno.

Regarding claims 3 and 4, Farnsworth depicts multiple embodiments in which the high angled layer is the outermost layer (Figures 1, 3B, and 3C). While no single embodiment depicts the high angled layer as being both narrower than the innermost layer and wider than the middle layer, it is clearly evident that Farnsworth places no criticality on the axial extent of the outer, high angled layer in relation to the inner and middle layers, only stating that the maximum axial width of the belt assembly (as a whole) is in the range of 90 to 110% of the tread width. The specific selection of an embodiment in which the high angled layer is wider than the middle layer and narrower than the innermost layer would have been within the purview of one of ordinary skill in the art at the time of the invention, particularly since it is well known to stagger the ends of belt plies so stresses do not buildup at the ply ends. In order to satisfy the claimed invention, for example, the inner layer in either Figure 3B or 3C would have to be extended beyond the outer layer or the outer layer in Figure 1 would have to be extended beyond the middle layer. Thus, since Farnsworth describes a plurality of embodiments in which the axial extent of the respective plies is axially varied and Farnsworth fails to suggest a criticality in any specific arrangement, it would have been obvious to one of ordinary skill in the art at the time of the invention to form a belt assembly as defined by the claimed invention, there being no conclusive showing of unexpected results to establish a criticality for this arrangement.

Regarding claim 5, applicant requires that the cord to cord distance between the end of the middle cord layer and the adjacent outermost cord layer is greater than 0.15 times the cord to cord distance between the same end of the middle cord layer and the adjacent inner layer. A fair reading of Farnsworth as a whole suggests that the relevant distances would be approximately the same, as would be expected by one of ordinary skill in the art at the time of the invention. Thus, the cord-to-cord distance (defined by topping rubbers) between the middle cord layer the outermost cord layer would be approximately 1.0 times the cord-to-cord distance between the middle cord layer and the inner cord layer.

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over either one of (a) Bourdon, Kohno, Kabe, and Suzuki or (b) Farnsworth and Kohno as applied in claim 1 above and further in view of Okamoto (US 5,779,828, of record). Okamoto is applied in the same manner as set forth in Paper Number 20, Paragraph 6.

As previously mentioned, each of the combination of references teaches or suggests all the limitations of claim 1. The references, however are silent with respect to the employment of an end cover rubber having a wavy surface in accordance to the limitations of the claimed invention (peak to trough distance of between 0.05 and 0.25 mm). In any event, a variety of end cover rubbers are conventionally used in the ends of breaker or belt layers to prevent "belt end separation". Okamoto describes a specific type of end cover rubber in the belt region having a wavy surface and a peak to trough distance of between 0.05 and 0.25 mm, which mimics the range outlined by the claimed invention (Column 8, Lines 53-61). Thus, it would have been obvious to one of ordinary

skill in the art at the time of the invention to include the specified wavy end cover rubber, as suggested by Okamoto, in the general tire construction of either one of Bourdon or Farnsworth. The use of such a wavy end cover rubber provides reinforcement in both the radial and axial direction, further reducing the occurrence of "belt end separation", which is a desirable property in all pneumatic tire constructions.

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over either one of (a) Bourdon, Kohno, Kabe, and Suzuki or (b) Farnsworth and Kohno as applied in claim 1 above and further in view of Imamura (US 3,913,652, of record). Imamura is applied in the same manner as set forth in Paper Number 20, Paragraph 7.

As previously mentioned, each of the combination of references teaches or suggests all the limitations of claim 1; however, the references are silent with respect to the use of end cover rubber that is joined to a widthwise outer end face of the cord layer over a full periphery of the cord layer, as depicted in Figure 11. In any event, as stated in the previous paragraph, a variety of end cover rubbers are conventionally used in the ends of breaker or belt layers to prevent "belt end separation". Furthermore, Imamura depicts multiple arrangements of conventional end cover rubbers, including an embodiment in which the end cover rubber is joined to a widthwise outer end face of the cord layer over a full periphery of the cord layer (Figure 1C). In describing the width of the end cover rubber or rubber reinforcing layer, Imamura provides multiple embodiments (Examples 4 and 5) in which the gauge of the end cover rubber is approximately 1 mm, which is well within the broad range of 0.05 to 5 mm defined by the claimed invention. As such, it would have been obvious to one of ordinary skill in

the art at the time of the invention to employ an end cover rubber in accordance to the limitations of the claimed invention, as suggested by Imamura, in the general tire construction defined by either one of Bourdon or Farnsworth. This particular type of end cover rubber represents one of many conventional such rubbers used to prevent "belt end separation" and would have been readily appreciated by one of ordinary skill in the art.

Response to Arguments

7. Applicant's arguments with respect to claims 1 and 3-7 have been considered but are moot in view of the new ground(s) of rejection. It is initially noted that applicant has amended claim 1 to require that the outer, high angled layer have a width that is less than the width of the inner layer. As such, the rejections using Ishiguro have been withdrawn since the outer, high angled layer of Ishiguro is designed to extend well beyond the crown region and into the sidewall region. Regarding the additional arguments, applicant contends that (a) Bourdon does not teach or suggest the roles of the outermost layer and the compression modulus of the coating rubber and (b) Farnsworth does not at all teach or suggest the claimed relationship between the groove and the belt and also, the reference teaches that the cords of the middle cord layer and the outermost cord layer are crossed.

Regarding (a), the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). In particular, the outer, high angled

layer of Bourdon would obviously provide protection to the inner and middle layers, it being the closest to the ground contact surface (first line of defense). Also, with respect to (a), Kohno suggests a compression modulus of at least 200 kgf/mm2 for a similar, outermost belt layer formed of steel, which is nearly 100 times greater than the "at least 200 kgf/cm2" required by the claimed invention. While the reinforcing elements in Kohno are circumferentially oriented, Kohno suggests that the specific coating rubber properties eliminate the movement of the cords and thus reduce the occurrence of buckling. This benefit is independent of the inclination angle of the reinforcing elements in the outermost belt ply and as such, would have been readily appreciated in outermost belt plies formed of steel and having non-circumferential oriented reinforcing elements. The critical feature is that including a coating rubber composition having such a compression modulus in the outermost, steel belt layer of Kohno reduces the movement of cords, not specifically circumferential cords, but cords in general and ultimately reduces the occurrence of buckling. It is further noted that applicant attributes this same benefit to the inclusion of the claimed coating rubber composition.

With respect to (b), while Farnsworth does not expressly depict a tread groove(s), it is extremely well known that tread grooves represent a fundamental component of tires (included for traction). One of ordinary skill in the art at the time of the invention would have found it obvious to arrange the end of the outer layer outward of the outermost tread groove in view of the ranges defined by Farnsworth. In particular, Farnsworth suggests that the maximum extent of the belt assembly is between 90 and 110% of the tread width. This range suggests that the outer layer

would extend over a significant distance, if not all, of the tread width. It is further noted that tread grooves are not commonly disposed at the direct ends of the tread width but rather are arranged over a smaller portion of the tread width (e.g. 80-90% of tread width). Thus, one of ordinary skill in the art at the time of the invention would have readily appreciated an embodiment in which the outer layer is disposed axially outward of the outermost tread groove. Also, regard the angles of the middle and outer cord layer, applicant requires that "the cords of an outermost layer have an inclination angle of 45 to 115 degrees with respect to the equatorial plane as measured in the same direction as in the cords of the middle layer". It is noted that any cords having an angle greater than 90 degrees would necessarily cross with the cords of the middle cord layer. In this instance, Farnsworth suggests cord angles as high as 70 degrees for the outermost layer, which is analogous to an angle of 110 degrees with respect to the equatorial plane as measured in the same direction as in the cords of the middle layer.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Justin R Fischer** whose telephone number is **(703) 605-4397**. The examiner can normally be reached on M-F (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Ball can be reached on (703) 308-2058. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Justin Fischer

August 8, 2003

Michael W. Ball
Supervisory Patent Examiner
Technology Center 1700